



Bio/Diversity Project

Lesson Title: Adaptations of Desert Animals and Desert Humans

Teacher: Sarah Heiman and Mira Theilmann

Grade Level: 7th

Time: 60 minutes

Adapted from: [Water You Drink?](#), [Climate and Animal Migration](#); [Global Patterns of Human Migration](#)

AZ State Science Standard:	<p>6.L2U3.12</p> <ul style="list-style-type: none"> ● Engage in argument from evidence to support a claim about the factors that cause species to change and how humans can impact those factors.
Content Objective: Math, Reading, Science, Writing, Other:	<ul style="list-style-type: none"> ● Students will be able to <ul style="list-style-type: none"> ○ Define adaptation in terms of animal and human adaptation. ○ Identify examples of adaptation to climate and environment. ○ Compare and contrast animal and human migration. ○ Evaluate how humans have affected animal migration
Scientist of the Week:	<ul style="list-style-type: none"> ● Michael Charles, 25 years old ● Navajo (Dine) ● Lives in Columbus, Ohio ● Student at Ohio State University; also a member of the Idle No More campaign (supports indigenous land rights) ● Focuses on how climate change is affecting native people in North America ● Spoke at the United Nations Climate Change Conference in 2017 ● Maka Monture Paki, 25 years old ● Program Coordinator of the United States Arctic Youth Ambassador Program (AYAP) ● Lives in Anchorage, Alaska ● Went to college at Northern Arizona University (NAU) ● Youth climate change activist ● Became involved in environmental activism in high school and co-founded the U.S. Arctic Youth Ambassador Program

Vocabulary	Materials
<ul style="list-style-type: none"> ● Adaptation ● Climate ● Evolution ● Seasonality ● Migration 	<p>Provide a bulleted list of relevant materials for the lesson.</p> <ul style="list-style-type: none"> ● Colored pencils/crayons/markers ● Tape ● Adaptation + Migration worksheets ● Powerpoint presentation



Seasonality: Covering difference in seasonality (annual change)

<i>Monsoons</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec.- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
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Guiding Questions:

- What techniques did ancient humans, such as the Hohokam, use to survive extreme weather in the Sonoran Desert? How have these practices been adapted to modern times?
- Why do animals adapt to the desert climate and conditions?
- What role does evolution play in adaptations?
- Why do some animals migrate? Why do humans migrate? What are the factors that push animals/humans to do so?
- How does animal migration influence humans and vice versa?

Engagement/Introductory Activity:

- Bellwork Question: What would the Sonoran Desert look like 100 years from now? What would it look like if temperatures in the summer rose to 130 degrees?
- Introduce the environment and climate of the Sonoran Desert and why it has such a unique set of adaptations. Watch video about [Sonoran Desert adaptations](#)
- Explain what adaptations look like in the Sonoran Desert
 - “Over a great many generations individual species of Sonoran Desert plants and animals have made adjustments to survive conditions of limited water and heat. These adjustments are called adaptations” (Water You Drink?)

Exploratory Activity:

Animal Adaptation

1. Hand each student information about one organism from the worksheet “[Sonoran Desert Animals](#)” and ask students to draw one image illustrating one of the ways their organism has adjusted to the climate of the Sonoran Desert
 - a. The students will each draw a picture representing how that species has adapted to the conditions in the Sonoran Desert (they should not include any words or symbols)
 - b. After 10-15 minutes for completing this part of the activity, ask the students raise their hands to show one teacher the finished work. The teacher will supply the tape so that the student can tape their art to the cabinets in the back of the room. Allow the students a few minutes to look at the finished artwork.
 - c. Once all students are done and seated, ask for volunteers to explain their artwork to the class.
2. Review some examples of primitive adaptations of animals and compare to students’ artwork
 - a. Emphasize the fact that evolution is random, but that when animals randomly mutate, they sometimes survive better in certain weather or climates.
 - i. Pick a few animal species (examples provided below) to illustrate Sonoran Desert adaptations; include a brief description of characteristics, the animal’s adaptations to its habitat, and adaptations related to migration route, frequency of migration, and reason for migration.
 - ii. Ex. 1: Rufous Hummingbird
 - iii. Ex 2: White-winged dove
 - iv. Ex 3: Lesser long-nosed bats
 - v. Ex 4: White-tailed deer
 - b. Review how seasons and adaptations relate (hibernation, reproduction, flowering, and in general how species time their life cycle to seasons) and how some depend on that change in seasonality to survive (i.e. climate change resulting in changing temperature and weather patterns could affect

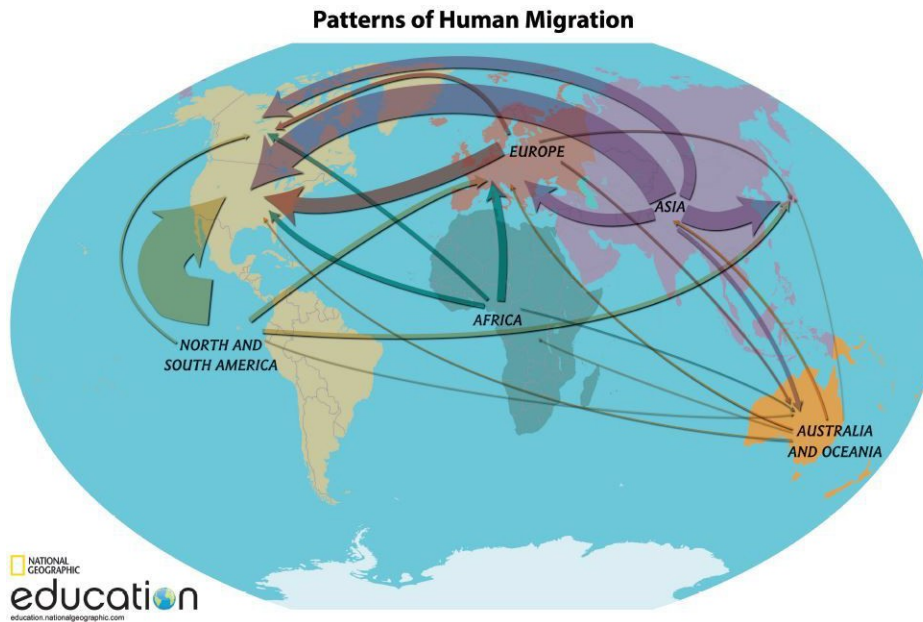


species reproduction, health, and growth)

- i. Ex. 1 Gila monster - inactive nine months of a year. Active in the mornings to find large eggs, otherwise, “it waits out the hot, dry days, living off the fat stored in its expandable plump tail.” ([Desert Museum](#))
 - ii. Ex. 2: Mule Deer: Active all year but move to the mountains in the summer to be cooler.
 - iii. Ex 3: Sonoran desert tortoise: hibernates in the ground in the winter to preserve warmth, burrows in the summer to escape the heat
- c. Review how water and adaptations relate (monsoons, snowmelt, flash flood)
- i. Describe the nature of water as a precious resource in the Sonoran Desert. How it is stored over long dry periods, how quickly species must react to sudden rains (light or monsoonal), and what rivers in the Sonoran Desert support.
 1. Ex 1: Gambel's Quail and Rufous-winged Sparrows won't nest unless rain supports enough insect/fruit to feed offspring
- ci. Relate human and animal migration patterns with [Pronghorn deer migration video](#)

Human Adaptation

1. Pass out “Human Adaptation and Migration” worksheet and
2. Ask students to identify why humans migrate- provide examples of push and pull factors people in the Americas may have faced such as increasing temperatures, war, or job opportunities.
3. Fill out the worksheet provided in which students will draw an arrow connecting countries where they think people will migrate from.
 - a. Which countries are the most people leaving (or emigrating) from? (Asia)
 - b. Which countries are the most people moving to (or immigrating)? (North America)
4. Show students the [migration routes map](#)



5. Now that they have learned about animal adaptations in the Sonoran desert, can they think of any human adaptations? Give them a few minutes to write 3 adaptations on the worksheet and allow time for students to give examples.
 - a. Ex. 1 Tohono O'odham farmers plant crops bi-annually, to follow seasonal rains. Their fields are designed to catch water and channeling it to crops planting. Plots are dispersed among several washes to maximize scattered rains.
 - b. Ex. 2 Tohono O'odham farmers, desert spadefoots, and other species are timed with floodwaters, a



typical urban response to the threat of flooding has been to pour concrete. Discuss the original benefits thought to come with urban irrigation and the negatives from increased runoff and loss of water to evaporation

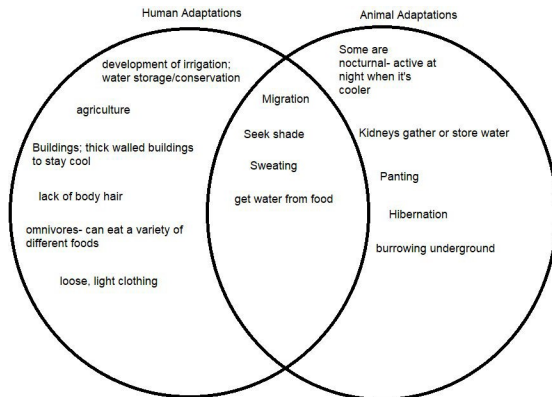
Explain:

Human Adaptation

- Explain and provide some examples (on a powerpoint) of human adaptations in the desert in addition to the examples the students came up with
 - Thick walled buildings to stay cool
 - Development of efficient irrigation and water storage methods
 - Omnivores- can eat a variety of different foods
 - Migration
- Define migration and provide examples of why people have migrated in the past.
 - How will climate change affect migration?
 - Are there any examples of migration in the current day?
 - Ask how human settlement may have affected the migration of the species?

Evaluation Activity:

- Summary: class Venn Diagram
 - Ask the class to help fill out a venn diagram on the board - one side is “human adaptations” and the other is “animal adaptations”
 - Students will raise hands to give answers
 - Example:



Extension Activity/Questions:

- Ask how climate change has affected the migration of the species.
 - How would increasing temperature force or stop migration of species?
 - How will the border wall might affect species migration?
 - What can humans do to help protect species that have to migrate?
 - Ask students to predict what adaptations might occur 100 years from now in the context of climate change?

Evaluation:

- Ask students to fill out the exit ticket answering the following questions/statements
 - List two push factors or reasons that would push people out of their home country
 - List two pull factors or reasons that would pull people to live in a specific country
 - Predict what adaptations scientists might see in the Sonoran Desert predictions of your own or from the class discussion.



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Animal Adaptations in the Sonoran Desert

1. Pick one species from “Sonoran Desert Animals” and draw the adaptation.



Name: _____

Human Adaptation and Migration

Definition of Migration: the movement of people from one place to another. This move could be temporary or permanent.

1. Currently, from which countries are people migrating too? Are the most people migrating from Europe to Australia? From South America to Africa?

Connect the continents with arrows showing where you think people are moving to and from.





2. List 2 **push factors** or reasons that would push people out of their home country.

Ex. War would be one example of a **push factor**

3. List 2 **pull factors** or reasons that would pull people to live in a specific country.

Ex. Wanting to move to a country for job opportunities would be a **pull factor**.

4. What might a human need to adapt to their environment? Write 3 predictions of your own or from the class discussion. One example would be hot temperatures during the day.



5. Predict what adaptations scientists might see in the Sonoran Desert 100 years from now? What would happen if temperatures in the Sonoran Desert rose by 10 degrees?

Write your prediction below **or** draw a picture of your prediction on the back of this worksheet.
